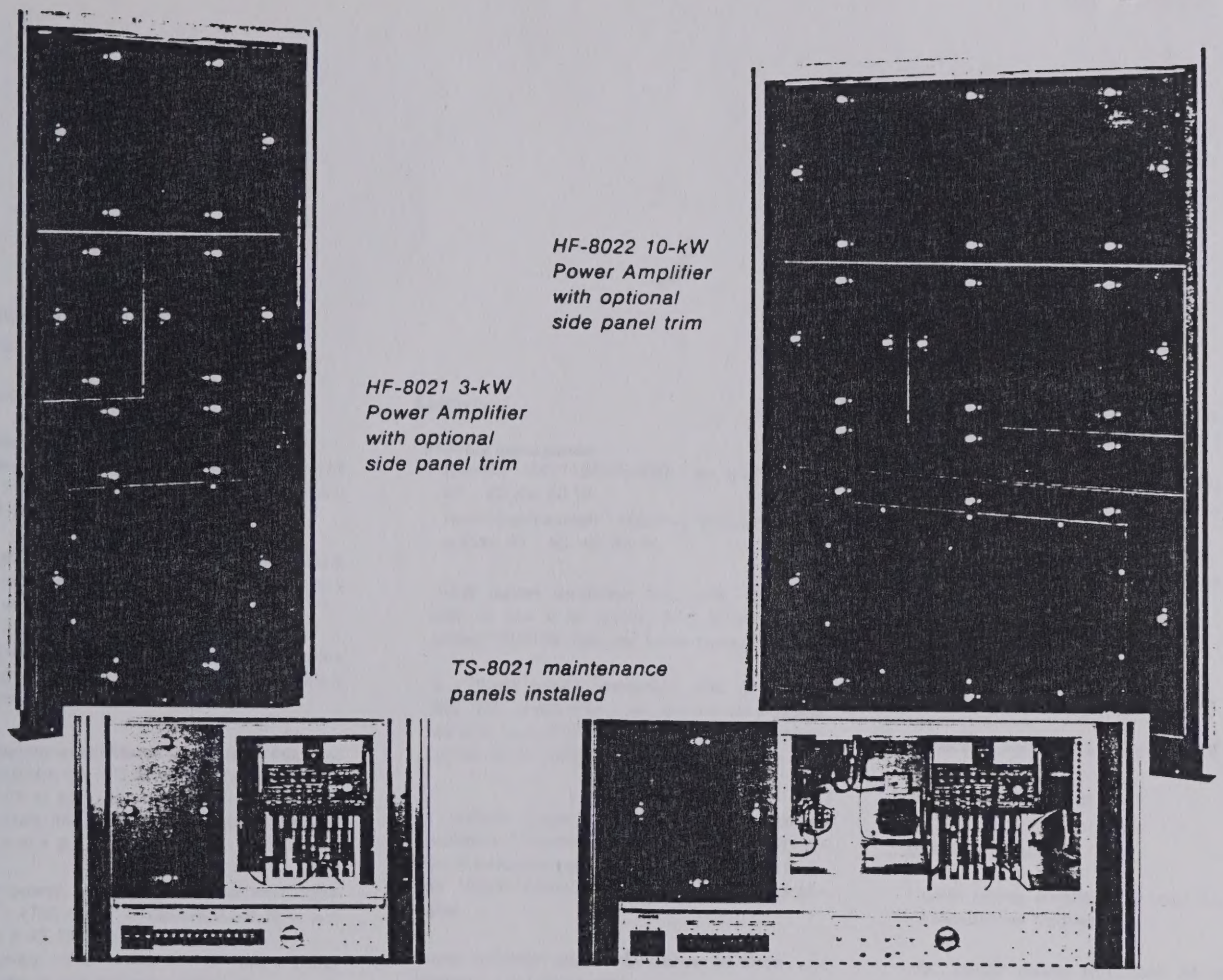

HF-8022 10-kW Power Amplifier with optional side panel trim

HF-8021 3-kW Power Amplifier with optional side panel trim

TS-8021 maintenance panels installed

HF-8021 3 kw & HF-8022 10 kw power amplifiers

The HF-8021 and HF-8022 Power Amplifiers use the highly successful Collins 208U-3A and 208U-10A Power Amplifiers as a baseline and employ the design-to-cost approach in keeping with the HF-80 family. Simplified control circuits were designed for compatibility with the processor control features of the rest of the HF-80 system. Rf circuits were retained from the performance proven 208U-series design.

Power output levels of these HF-80 Power Amplifiers are 3 kW for the HF-8021 and 10 kW for the HF-8022. Each can deliver full rated output level even when operating into a vswr of up to 3 to 1.

Power supplies for all the amplifiers are designed to operate from a wide range of primary input power, making an almost universal supply capable of operation with any international primary voltage. Power supply circuits accommodate up to 5 percent variations around the selected voltage while still delivering rated rf output power from the amplifier. New rf circuit design in these power amplifiers reduce intermodulation distortion to 46 dB below rated envelope power and harmonics 80 dB below rated power.

A TS-8021 optional plug-in maintenance panel speeds up maintenance checks and troubleshooting. The panel gives the maintenance technician direct control of the amplifier and displays monitor signal outputs so that only an rf input from the exciter or signal generator is required during maintenance checks. Switches allow manual transmitter keying, enabling or inhibiting various control voltages, servo operations, and advancing the tune cycle operation one step at a time. Monitor signals aid rapid determination of fault location to major functional areas of the amplifier.

Transmitter and Transceiver Characteristics

Physical

Size (nominal)

Exciter and receiver/exciter: 483 mm w x 178 mm h x 531 mm d (w/handles) (19 in w x 7 in h x 20.9 in d).

1-kW power amplifier: 483 mm w x 267 mm h x 653 mm d (w/handles) (19 in w x 10.5 in h x 25.75 in d).

1-kW power supply: 483 mm w x 267 mm h x 636 mm d (w/handles) (19 in w x 10.5 in h x 25.06 in d).

3-kW power amplifier: With full trim: 808 mm w x 1753 mm h x 705 mm d (31.81 in w x 69 in h x 27.75 in d).
Untrimmed: 660 mm w x 1753 mm h x 635 mm d (26 in w x 69 in h x 25 in d).

10-kW power amplifier: With full trim: 1237 mm w x 1753 mm h x 705 mm d (48.72 in w x 69 in h x 27.75 in d).
Untrimmed: 1168 mm w x 1753 mm h x 635 mm d (46 in w x 69 in h x 25 in d).

Weight (nominal)

Exciter: 19 kg (42 lb).

Receiver/exciter: 19 kg (42 lb).

1-kW power amplifier: 23.6 kg (52 lb).

1-kW power supply: 71.6 kg (158 lb).

3-kW power amplifier: With full trim: 499 kg (1100 lb).
Untrimmed: 429 kg (945 lb).

10-kW power amplifier: With full trim: 849 kg (1870 lb).
Untrimmed: 754 kg (1660 lb).

Environmental

Temperature: 0 to +50 °C (+32 to +122 °F), full performance; -20 to 0 °C (-4 to +32 °F), reduced performance; -57 to +70 °C (-71 to +158 °F), nonoperating.

Relative humidity: 0 to 95 percent at 30 °C (86 °F).

Altitude: All: 3,048 m (10,000 ft) at +50 °C (+131 °F).

All: 4,572 m (15,000 ft) at +25 °C (+77 °F).
All: 12,192 m (40,000 ft), nonoperating.

Electrical

Primary input power

Exciter: 100/115/215/230 V ac ±10%, 47 - 63 Hz; 80 W.

Receiver/exciter: 100/115/215/230 V ac ±10%, 47 - 63 Hz; 95 W.

1-kW power amplifier: 105, 115, 122, 210, 230, or 244 V ac ±10%; 47 - 63 Hz; single phase; 3500 W max for 1-kW output.

3-, 10-kW power amplifier: 208, 225, 243, 360, 390, or 422 V ac ±5%; 47 - 63 Hz; 3-phase delta or wye; 9100 W for 3-kW output; 23,000 W for 10-kW output.

Rf output (from exciter; input for power amplifier): 100 mW pep or average for rated output; (2 watts average input power accepted by 3- and 10-kW amplifiers without damage to circuits).

Power amplifier input impedance: 50 ohms, unbalanced; 1.3:1 vswr, max.

Rf output (from power amplifiers): Into 50 ohms, 3:1 vswr maximum load.

1-kW: High power: 1 kW, +0.5, -1.0 dB, pep or average.
Low power: 300 to 700 W, adjustable.

3-kW: High power: 3 kW, +0.5, -1.0 dB, pep or average.
Low power: 700 to 2000 W, adjustable.

10-kW: High power: 10 kW, +0.5, -1.0 dB, pep or average.
Low power: 3 to 7 kW, adjustable.

Frequency range

Exciter: 1.6000 to 30 MHz (100-, 10-, or 1-Hz tuning increments, depending on options).

1-kW power amplifier: 1.6 to 30 MHz.

3-, 10-kW power amplifiers: 2 to 30 MHz.

Frequency stability: Not less than 5×10^{-7} over specified temperature range; drift rate of not more than 3×10^{-8} per week.

Optional oven standard provides not less than 1×10^{-8} over specified temperature.

External standard option provides stability of the 100-kHz, 1-MHz, or 5-MHz external standard used.

Exciter bandwidth: 250 Hz, max, from carrier; 3000 Hz, min, to 4-dB points, SSB modes.

Modes of operation: A3B/A9B (ISB), A3J (USB or LSB), A3H (AME), A1 (CW), A3A (pilot carrier), standard. F3 (FM) optional.

PA bandwidth: 12-kHz, 0.1-dB max variation over a 3-kHz segment.

Frequency tune time

Exciter: 2 ms nominal, 5 ms max.

Power amplifiers: 5 s nominal, 10 s max.

Duty cycle: Continuous.

Harmonic output

1-kW power amplifier: At least 54 dB below fundamental frequency.

3-, 10-kW power amplifiers: At least 80 dB below fundamental frequency.

Intermodulation distortion

1-kW: 41 dB below pep of two equal tones at rated output.

3-, 10-kW: 46 dB below pep of two equal tones at rated output.

Rf protective circuits: Internal gain control: Protects amplifier from damage due to overdriving or abnormal tuning.
Reflected power: Unkeys amplifier when reflected power is greater than 3:1 vswr at full output power.
Antenna interlock: Prevents amplifier keying if an rf load is not present.

Audio circuits (both channels when in ISB) line: Input: 600 ohms ±10%, balanced; 0 dBm, nominal, for full rated output; adjustable between -20 and +10 dBm.
Output: 600 ohms ±10%, balanced; 0 dBm, nominal; adjustable between -20 and +10 dBm.

Microphone: Dynamic type: 200 ohms ±10%, unbalanced; -55 dBm, nominal, for rated output from power amplifier.

Specifications subject to change without notice